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illustrate Dr. Haast's Paper; from water-colour sketches taken on the spot.

Previous to reading the first Paper of the evening, the PRESIDENT called attention to the series of the above-mentioned beautiful chromo-lithograph views of the mountain-scenery of New Zealand, after which

The first Paper, which was entitled "*On the Southern Alps of Canterbury, Middle Island, New Zealand*," by Dr. HAAST, Provincial Geologist, was read, in which the author briefly summarized the results of his numerous surveys during the years 1861-62-63. This magnificent snow-clad range, from which descend enormous glaciers, reaches in this province its greatest elevation, forming the culminating point of the great back-bone that runs through both islands from north-east to south-west, which is only broken through at Cook's Straits, and rises in the North Island to peaks almost as lofty, such as the well-known cone of Mount Egmont. The pyramidal form is everywhere the marked feature of the huge masses, numbers of which exceed 10,000 feet in height; while Mount Cook, the highest summit of all, is 12,460 feet, and about 30 miles from the west coast. Between each mountain-system, as it were (some of which, however run for many miles without any traces of a *col*), occurs a pass of varying altitude, generally very inaccessible, some as high as 6500 feet to about 8000 feet; and these intervening depressions form the watershed of rapid and formidable mountain-torrents which fall into the ocean on the west coast. The eastern flanks are drained in like manner by glacier-streams, which, however, having a longer distance to run ere reaching the east coast, and encountering huge lakes which regulate their flow to some extent, make this side of the range eminently suitable for an emigration-field. Nothing can exceed the beauty of the tints both of sky and vegetation, or the singular glacial anomalies that present themselves on some of the glaciers; as, for instance, that of the River Godley, which has two waterfalls falling from its eastern edge into two deep gorges, only separated by a buttress of rock, as depicted in one of the spirited sketches made on the spot, which were exhibited at the Meeting. Between Mount Cook and Mount Stokes (in immediate proximity and almost as lofty as the former) there is a deep very abrupt cleft, as it were, constituting a *col* about 7000 feet above sea-level; beyond which the chain again rises, but is now bifurcated as it proceeds south-west, till a singular gap or break occurs—not above 1000 feet high, with a swamp on the summit, emptying in both directions, and presenting physical features which, it is believed, are without a parallel in any other portion of the globe—through which alone it is possible to reach the west coast from the

eastern portion of the province. This pass will probably be ere long made available for ponies at least. Beyond this singular pass the two chains reunite, as they approach Mount Aspiring on the frontier-line between Canterbury and Otago. All the valleys on either side of the chain are universally densely clothed with forest-trees; but while the chain on its western aspect has the appearance of an undulating rampart, on the east there extend numerous lofty chains running north and south, or at right angles to the main "back-bone," as it has been aptly termed. This configuration necessarily leads to there being an enormous amount of glacier surface, the moraines on which are unusually clearly defined and plentiful. The Tasman Glacier is 12 miles long, and at its lower extremity  $1\frac{1}{4}$  mile wide. Traces everywhere present themselves of many of these glaciers having at no remote period extended several hundred feet further than their present limits; and in the course of explaining the drawings, reference was made to several indications confirmatory of received theories of the mode of progression of glaciers under various physical conditions.

The PRESIDENT said he was proud to preside upon an occasion when a gentleman who was a geologist by profession had proved himself to be a good geographer, and had shown how intimately the subjects of physical geography and geology were united. Dr. Haast's labours were worthy of all commendation. His illustrations of the glaciers proved that the south-western part of New Zealand was in that intermediate state which all geologists were agreed upon was formerly the condition of the northern part of our own islands. In his last Anniversary Address he adverted to the belief of geologists, that all the northern part of Scotland was once in the condition that Greenland is at the present day; that is, covered with snow, with glaciers descending from the snowy mountains. In the illustrations and in the Paper which had been brought before them, they had a description of those phenomena as now at work in New Zealand, and in this respect it was a valuable communication, as presenting a history of an intermediate link in the development of glacial action descending from ancient to modern periods.

Mr. COOKSON, at the invitation of the President, pointed out on the map the locality of the various gold-diggings and coal-mines in the Otago and Canterbury districts. He also pointed out the locality of the Tirimakau River, at the mouth of which Mr. Whitcombe, the explorer, was drowned by the upsetting of his canoe.

The PRESIDENT related some of the circumstances connected with the death of Mr. Whitcombe, as set out at length in a letter, which, owing to accident, was not brought to the meeting. Sir Roderick particularly dwelt on the bold spirit of discovery which had led this explorer to sacrifice his life, and he was therefore most unwilling that the evening should pass without a tribute to his merit from all geographers present.

The following is an extract from the letter alluded to:—

*Extract of Letter from Dr. Haast to the President, dated Christchurch, N.Z., 15th June, 1863.*

"Knowing that an Alpine pass, about 5000 feet high, existed at the headwaters of the southern branch of the Rakaia, the Canterbury Government sent Mr. Henry Whitcombe to ascertain if this pass could be made available to

reach the west coast from Christchurch. He reached this saddle on the 20th of April, but, instead of returning, he continued the journey with one of his men, sending the rest of the party back to wait for him on the known Alpine saddle between the sources of the Hurunui (east coast) and Taramakau (west coast).

"Having crossed the pass, he arrived at the sources of the Hokitika, an important river which reaches the sea about 15 miles south of the Taramakau, on the 3rd of May. Although Mr. Whitcombe was an accomplished surveyor, a good mathematician and astronomer, who had worked successfully in India and Australia, he had had no experience in New Zealand bush-travelling, which requires not only strong men, able to carry a heavy load and to stand hunger, fatigue, and cold, but also a general knowledge of the nature of rivers and the best way of crossing them.

"Owing to his deficient arrangements, Mr. Whitcombe on reaching the coast was so exhausted, that he had great difficulty in walking to the Taramakau, where he hoped to find a Maori settlement, in order to procure some provisions, as they had finished all theirs.

"Unfortunately the few Maories who lived there had left the settlement, so they determined on following the coast to the mouth of the river Grey; for this purpose they had to cross the Taramakau, which is a large and rapid river.

"As no large canoe was to be found, they tied two small old ones together; but when they reached the current, their contrivance began to sink and drift towards the bar. Mr. Whitcombe, who was a good swimmer, jumped into the water and attempted to reach the shore; but, being in such an exhausted condition, he was drifted into the surf at the mouth of the river, and unfortunately was drowned. His companion, who could not swim, had a most miraculous escape; by tying his right hand to one of the canoes, he succeeded in remaining with it, being tossed about for many hours by the advancing and receding waves. He was at last cast on shore, and, on recovering himself, he worked his way up the banks of the Taramakau for a few miles, and fortunately fell in with some Maories, who gave him a few potatoes. He at last arrived at the saddle of the Taramakau, where his former companions awaited them; and I may here state, as an instance of the sufferings which he had endured, that his companions, even after conversing with him for some time, did not recognise him, so much was he altered, and this after an absence of only twenty days."

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The second Paper was entitled:—

"*On the Frontier Province of Loreto in North Peru.*" By Professor Don ANTONIO RAIMONDY of Lima (Honorary Corresponding Member, R.G.S.).

Communicated by W. BOLLAERT.

THIS communication gives an instalment of the author's labours during the past twelve years, to make known the many valuable products of Peru, in carrying out which object he has made numerous excursions in all directions into the interior.

The province of Loreto is as large as all the other departments together, and extends from the Cordillera region of Pasco to the junction of the Amazon with the Jarava, its south-west portion being mountainous, while its eastern districts consist of extensive plains, well-watered and covered with luxuriant vegetation. In the